

CLAIMS

1. A diesel engine control system comprising:

5 an injector for directly injecting fuel into a combustion chamber of a diesel engine;

injection quantity controlling means for controlling fuel injection quantity by varying a period of electric current supply to the injector;

10 estimating means for estimating that an electric current supply period when a prescribed combustion state is obtained is the current supply period for injecting the amount of fuel required for the prescribed combustion state; and

control data correcting means for correcting control data of the injection quantity controlling means based on the estimated current supply period.

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2. A system according to claim 1, wherein:

the estimating means estimates the current supply period during prescribed low-load, low-rpm operation.

20 3. A system according to claim 1 or 2, wherein:

the diesel engine is responsive to a prescribed operating state for conducting split fuel injection that divides the amount of fuel injected during each cycle into multiple injections; and

25 the estimating means makes the estimation during split fuel injection.

4. A system according to any of claims 1 to 3, wherein:

the estimating means and the control data correcting means conduct current supply period estimation and control data correction at multiple fuel injection pressures.

5 5. A system according to claim 4, wherein:

the control data correcting means calculates deviation between a preset basic current supply period and the estimated current supply period and, based on the calculated deviation, corrects the control data at injection pressures other than said multiple fuel injection pressures.

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6. A system according to any of claims 1 to 5, wherein:

the estimating means decides that the engine is in the prescribed combustion state when a prescribed engine speed is obtained.

15 7. A system according to any of claims 1 to 6, wherein:

the diesel engine is equipped with multiple cylinders; and

the estimating means and control data correcting means estimate the current supply period and correct the control data separately for each cylinder.

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8. A diesel engine control system comprising:

an injector for directly injecting fuel into a combustion chamber of a diesel engine;

25 injection quantity controlling means for controlling fuel injection quantity by varying a period of electric current supply to the injector;

pilot injection control means operative in a prescribed operating state for causing the injector to conduct pilot injection of an injection

quantity smaller than an injection quantity of a main injection prior to the main injection of fuel;

misfire generating means for generating a misfire state by varying the current supply period to change the injection quantity of the pilot injection;

misfire discriminating means for discriminating misfire state;

misfire limit setting means for setting the period of current supply to the injector when misfire is detected as a misfire limit current supply period; and

pilot control correcting means for correcting control data of the pilot injection control means based on the misfire limit current supply period.

9. A system according to claim 8, wherein:

the misfire discriminating means discriminates misfire based on the rotational speed of the crankangle.

10. A system according to claim 9, wherein:

the diesel engine is equipped with multiple cylinders; and

the misfire discriminating means discriminates misfire state based on difference in the crankshaft rotational speed at the time of explosion in the misfiring cylinder and the crankshaft rotational speed at the time of explosion in another cylinder.

11. A system according to claim 10, wherein:

the misfire discriminating means discriminates occurrence of misfire state when the difference is equal to or greater than a prescribed

value.

12. A system according to any of claims 8 to 11, wherein:

5 the pilot control correcting means sets a period obtained by adding a prescribed period to the misfire limit current supply period as the lower limit value of the current supply period for pilot injection.

13. A system according to any of claims 8 to 12, wherein:

10 the misfire generation, misfire discrimination, misfire limit setting and pilot control correction are each conducted at multiple fuel injection pressures.

14. A system according to any of claims 8 to 13, wherein:

15 the diesel engine is equipped with multiple cylinders; and the misfire generation, misfire discrimination, misfire limit setting and pilot control correction are conducted separately for each cylinder.

15. A system for controlling a diesel engine conducting split fuel injection that divides the amount of fuel injected during each main injection into multiple injections in a prescribed operating state, the system comprising:

20 an injector for directly injecting fuel into a combustion chamber of the diesel engine;

injection quantity controlling means for controlling fuel injection quantity by varying a period of electric current supply to the injector;

25 estimating means for estimating during the split fuel injection that an electric current supply period when a prescribed combustion state is

obtained is the current supply period for injecting the amount of fuel required for the prescribed combustion state;

control data correcting means for correcting control data of the injection quantity controlling means based on the estimated current
5 supply period;

pilot injection control means operative in a prescribed operating state for causing the injector to conduct pilot injection of an injection quantity smaller than an injection quantity of the main injection prior to the main injection of fuel;

10 misfire generating means for generating a misfire state by varying the current supply period to change the injection quantity of the pilot injection;

misfire discriminating means for discriminating misfire state;

misfire limit setting means for setting the period of current supply
15 to the injector when misfire is detected as a misfire limit current supply period; and

pilot control correcting means for correcting control data of the pilot injection control means based on the misfire limit current supply period.

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16. A diesel engine control method that controls fuel injection quantity by varying a period of electric current supply to an injector for directly injecting fuel into a combustion chamber, the method comprising:

a step of estimating that the electric current supply period when a
25 prescribed combustion state is obtained is a current supply period for injecting an amount of fuel required for the prescribed combustion state; and

a step of correcting control data of an injection quantity controlling means based on the estimated current supply period.

17. A diesel engine control method that controls fuel injection quantity
5 by varying a period of electric current supply to an injector for directly injecting fuel into a combustion chamber, the method comprising:

a step conducted in a prescribed operating state of causing the injector to conduct pilot injection of an injection quantity smaller than an injection quantity of a main injection prior to the main injection of fuel;

10 a step of generating a misfire state by varying the current supply period to change the injection quantity of the pilot injection;

a step of discriminating misfire state;

a step of setting the period of current supply to the injector when misfire is detected as a misfire limit current supply period; and

15 a step of correcting control data of the pilot injection control means based on the misfire limit current supply period.